

Systems employing Code Division Multiple Access (CDMA) techniques with orthogonal downlink (forward link) and quasi orthogonal uplink are generally uplink capacity limited due to other user interference, when users are moving moderate speeds or faster. These CDMA systems employ powerful interleaving and coding to increase robustness against adverse channel conditions and other user interference. It is, therefore, usual to employ diversity techniques at the base station receiver (uplink) but not on the down link. With the advent of third generation (3G) wireless communications systems i.e. IMT 2000 family members comprising CDMA (both direct spread and multicarrier) and TDMA technology and with mobile data also carried over upgraded existing networks, it is anticipated that more capacity will be required in the downlink rather than the uplink (due to data asymmetry). Similar data symmetry issues will arise in fixed wireless access system terminals, although very much higher power transmitters in fixed access terminals is possible than compared with mobile hand portables (e.g. 2 watts compared with 200 milliwatts). Since fixed wireless access terminals are usually mains powered with a battery backup provided by larger electrical cells than would be viable to put into a handset or other portable terminal. Additionally fixed wireless access terminals can be fitted with remote handsets or user interfaces and antennas positioned either externally or some distance from the users head/body.

Since fixed wireless access terminals are static or move infrequently, for example, between the rooms of a subscriber's residence, some of the techniques applied to mobile down links, such as interleaving, are relatively ineffective. In these cases down link capacity and coverage can potentially be the limiting factors in deployment. Diversity techniques are well established and known to help this situation but have generally been considered too complex to implement in a low cost terminal. US Patent No. 6,167,286 (Nortel Networks Limited) provides a diversity scheme for base stations with several antennas. This arrangement only processes the outputs from receive antennas which contribute to the overall carrier to raise ratio. This arrangement comprises phase rotators and continually monitors received power levels which results in a moderately complex system suitable for base stations having a large number of antennas.

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